Gulf Hypoxia Initiative: Precision Conservation Blueprint for Wildlife, Water Quality, Energy & Agriculture

Dozens of agencies & organizations in the 7 Landscape Conservation Cooperatives (LCCs) of the Mississippi River Basin

Coordinated by:
Kelley Myers & Gwen White, U.S. Fish & Wildlife Service
Michael Schwartz, The Conservation Fund

Contact: gwen_white@fws.gov; 812-212-7455
Online at: https://tallgrassprairielcc.org/issue/gulf-hypoxia
We are losing ecosystem services that boost agricultural production and resilience.

- Pest control
- Pollination
- Nutrient cycling
- Soil health
- Water quality
- Flood/drought mitigation
- Carbon sequestration
- Biodiversity / genetic resources
“Water, water everywhere... nor any drop to drink.” ~Rime of the Ancient Mariner

Local Water Concerns

Gulf Hypoxia

USGS SPARROW model updated
The Midwest & MAV don’t even show up on the climate connectivity map.

What *could* the Midwest & Mississippi Alluvial Valley produce?

**Migratory Pathways**

*Monarch Butterfly Migration Spring 2016*

*NRCS Conservation Solutions... Drainage Water Management*

*Honey Nut Cheerios* au miel et aux noix

*Change in bird species richness with low input high diversity bioenergy*

*NABCI 2016*

**Ecosystem Services**

*STRIPS*
Landscape Conservation Cooperatives
Seven LCCs overlap the Mississippi Basin

**Map Key:**

13. Plains & Prairie
   Potholes LCC

16. Upper Midwest &
   Great Lakes LCC

7. Great Plains LCC

4. Tallgrass Prairie LCC

1. Appalachian LCC

8. Gulf Coast Prairie LCC

9. Gulf Coastal Plains &
   Ozarks LCC
What if a “think tank” of natural resource researchers and managers came together to align their actions?
What were the steps for developing a framework for mission alignment?

**2014 Memphis Stakeholders Workshop:**
- What **SHARED OUTCOMES** do we want?
- What are **SHARED PERFORMANCE METRICS**?
- What are the **PHYSICAL & SOCIAL DRIVERS**?

**2015 Online Work Teams & Blueprint v1.0:**
- **WHAT PRACTICES** will we emphasize?
- **WHERE** in the Basin & Pilot Watersheds is the greatest opportunity for investment?

**2016 Indy Research & Design Forum & 2017 Precision Conservation Blueprint v1.5:**
- How can we **TEST DRIVE & REFINE** these tools in pilot basins?
**MISSISSIPPI BASIN / GULF HYPOXIA INITIATIVE**

**Shared Goal:** Target conservation investments that benefit fish and wildlife in a resilient, multifunctional landscape while also addressing agriculture, energy, local water quality – and ultimately, Gulf hypoxia.
Which 12 high impact practices MAXIMIZE multi-sector benefits?

**Basin-wide**
- Biomass Production
- Buffer Strips
- Cover Crops
- Wetlands
- Uplands Prescribed Fire
- Grassland & Grazing Management

**Upper Mississippi Basin / Midwest**
- Drainage Water Management
- Hydrologic Restoration
- Two-Stage Ditches

**Mississippi Alluvial Valley**
- Floodplain Reforestation
- Vegetative Diversity
- Water Diversion
High Impact Practice -- Drainage Water Management

... mitigates drought, keeps nutrients in place & provides shorebird habitat
Where can we make every dollar count for wildlife, water quality, energy & agriculture?

Bringing "dead zones" in the Gulf of Mexico back to life will require continental-scale thinking - starting on the farm fields and rivers of the Midwest.

More on Gulf Hypoxia

- Agroecology Focal Area
- Mississippi River Basin/Gulf Hypoxia Initiative
- Monarch Initiative
- Prairie Reconstruction Initiative
- River Restoration Focal Area
- Urban Conservation Focal Area

U.S. FISH & WILDLIFE SERVICE

Eastern Tallgrass Prairie & Big Rivers
Where is the highest nutrient loading?

Water Quality Priority Zone: highest nutrient loads from agriculture using USGS SPARROW model -- updated for changes in current cropland.
Where are the fish & wildlife interests?

Regional Focus Areas
- Audubon Important Bird Areas
- Bobwhite Conservation Initiative
- Ducks Unlimited
- U.S. Forest Service
- Grassland Priority Conservation Areas
- Joint Venture Focus Areas
- Upper Mississippi Forest Partnership

State Wildlife Action Plans (SWAPs)
- Alabama
- Missouri
- Indiana
- Nebraska
- Illinois
- North Dakota
- Iowa
- Ohio
- Kentucky
- Tennessee
- Minnesota
- Wisconsin
Where is social receptivity for action?

Watershed Projects as *indicators* of social capacity (500+ projects)

**Regional Examples**
- USDA-NRCS Mississippi River Basin Initiative
- USDA-NRCS National Water Quality Initiative
- Southeast Aquatic Resources Partnership
- The Nature Conservancy
- US EPA Section 319 Watersheds
- Fish Habitat Partnerships
- State Nutrient Reduction Plans
- etc.

**Local Examples**
- Big Darby Watershed Initiative
- Boone River Watershed Initiative
- Cedar River Basin Initiative
- Ohio Watershed in Distress
- Batture Wetlands (WREP)
Where could we align investment?
Where do we start?

Pilot Basins:
Water Quality + Wildlife + Watershed Projects + Marginal Land

- **Tier 1** (purple): Highest nutrient load potential and implementation interest
- **Tier 2** (green): Creating a multi-sector priority conservation corridor

6 Midwest watersheds contribute **over a quarter** of the Gulf nutrient load
(Source: The Nature Conservancy)

1) Wabash River  
2) Illinois River  
3) Iowa River  
4) Des Moines River  
5) Tennessee River  
6) Minnesota River
Precision Conservation Blueprint v.1.5
Case Studies using data layers

From Basin Scale to 30m Local Planning
County Planning Application: Decatur County, IN

Comprehensive Plan Revision

- What parts of the county have highest value for conservation and water quality protection?
- Where should zoning provide for working land uses and development?
Organization Planning Application:
The Nature Conservancy -- Prioritizing Floodplains in the Upper Mississippi & Lower Illinois Rivers

Reconnection Opportunities

- floodplain boundaries
- levee data
- LULC & PADUS
- nutrient loading/retention
- reconnection potential
- flood damage assessment

Floodplain Restoration Priorities

Legend:
- 1 in 5 year (20%) Flood Event
- Potential Nutrient (N) Reductions
- Land of Protection (years)
- Land Use/Activity Areas
- Potential Erosion (S) Reductions
- Potential Erosion (S) Reductions

The Nature Conservancy
Organization Planning Application: Sycamore Land Trust (IN) – Wetland Corridor
Regional Planning Application: JV waterfowl habitat conservation (DRAFT)

Upper Mississippi River and Great Lakes Joint Venture parameters: biological (breeding and non-breeding waterfowl habitat) and social (waterfowl supporters and ecological goods and services) weighted by stakeholders.

FINAL PRODUCT SUMMER 2017
What’s next for the multi-LCC Gulf Hypoxia Initiative?

- **Precision Conservation Blueprint v1.5** - Update data layers and integrate spatial analyses with other models and tools.
- **Practice fact sheets** - Refine the current list of high impact practices, expand information on cost-effectiveness and associate practices with the spatial analysis (“what to do where”).
- **Case studies** - Prepare a series of user case studies as examples of applying the products and tools.
- **Research** – Expand the FishTail stream vulnerability assessment to the Mississippi Basin. Develop landscape plans for prairie-based bioenergy. Quantify ecosystem services of 12 high impact practices. Develop a synthesis of human dimensions research to guide outreach and extension approaches. **Determine climate impacts on agriculture, water quality & adoption of practices.**
- **Performance metrics** - Parse out the multi-sector conservation benefits and develop “leading indicators” for landscape change from a short list of shared measures.
Online background & tools

- **Overview** – review all documents in the framework at: [https://tallgrassprairielcc.org/issue/gulf-hypoxia](https://tallgrassprairielcc.org/issue/gulf-hypoxia)

- **Data Basin** – to access viewer, register free of charge and join the group “Mississippi River Basin/Gulf Hypoxia Initiative” at: [http://databasin.org/groups/d52de40d017e4ce98c3914dba1bc4ee7](http://databasin.org/groups/d52de40d017e4ce98c3914dba1bc4ee7)

- **USGS ScienceBase** – login and download over 200 data layers at: [https://www.sciencebase.gov/catalog/item/54e37c9ce4b08de9379b51e3](https://www.sciencebase.gov/catalog/item/54e37c9ce4b08de9379b51e3)
Science Investment for Multi-Sector Conservation Design

Mississippi River / Gulf Hypoxia Initiative

Precision Conservation Blueprint v1.5

Visit us at -- TallgrassPrairieLCC.org
Contact: Gwen_White@fws.gov